

## TRANSLATION

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**(54) Title:**  
**PROCESS FOR STABILIZING MIXTURES OF  
REFRIGERATING MACHINE OIL AND REFRIGERANTS**

### **(57) Abstract**

The process for stabilizing mixtures containing refrigerant and refrigerating-machine oil (refrigerator oil) involves systems containing halogenated hydrocarbons. The improved stability is intended to prevent operational disturbances such as corrosion damage, deposits and plugging in the refrigeration cycle. This is achieved by adding organic amines and/or amides of organic acids to the mixture in a concentration of 0.1-4% relative to the refrigerator oil.

### **Field of application of the invention**

The invention concerns the stabilization of mixtures of refrigerator oil and refrigerants in refrigeration systems which operate especially with fluorochlorocarbons.

### **Characteristics of the known technical solutions**

In refrigeration systems as a result of the reactions between the refrigerant and the refrigerator oil, therefore in the case of insufficient refrigerant stability of the oil, undesired operational disturbances occur such as corrosion damage, deposits and plugging in the refrigeration cycle. These phenomena generally lead to the failure of the refrigeration system or to a reduction in the performance of the refrigeration system.

It is well known that the utilitarian properties of lubricating oils can be improved by the addition of additives. However, the addition of additives to refrigerator oils is not accepted in the technical world (H. Reimer, Klima- und Kälteing., 3, No. 12, 401, (1975)). It is argued that any material added increases the possibility of additional chemical reactions in the refrigeration cycle.

Stabilization of refrigerator oils by the addition of antioxidants such as di-isobutyl-p-cresol has only subordinate significance, because the refrigeration machines operated with fluorocarbons operate with exclusion of air. Also the addition of phenyl-alpha-naphthylamine, ethylenediamine-tetraacetic acid and phenantroline (US patents 3 791 959, 3 532 631) to the refrigerator oil has also been investigated. Such additives, however, have the disadvantage that they are poorly soluble in the refrigerator oil and at the operating temperatures of the refrigeration system they may give rise to deposits and plugging.

### **Purpose of invention**

The objective of the invention is to reduce the decomposition reactions taking place in the refrigeration cycle by means of additives and to limit disturbances caused by corrosion and deposition of solid products.

### **Presentation of the essence of the invention**

The invention has the task of finding additives whereby a sufficient refrigerant stability of lubricating oils for refrigeration compresses is achieved.

This problem is solved according to the invention by a process for stabilizing refrigerator oil/refrigerant mixtures containing halogenated hydrocarbons by adding to the mixture organic amines and/or amides of organic acids in a concentration of 0.1-4%, preferably 0.5-1% relative to the refrigerator oil.

Especially suitable as amines or amides are those compounds which dissolve well in oil and combine a low melting point with a high boiling point. Preferably those compounds are used whose boiling point at standard pressure is above 160EC.

### **Examples of embodiment**

#### Example 1

1 g of N,N-dimethyl-1-naphthylamine is added to 100 g of refrigerator oil and stirred vigorously. 1 ml of this mixture is brought into contact at 250EC for 96 hours in the Philipp test with difluorodichloromethane (F12). After this the contents of the reaction vessel are analyzed according to TGL 14637. The color index changed from 0 to 3. The chloride detection was negative.

Without the use of the additive the test gave a color index of 3 and a positive chloride detection.

#### Example 2

A mixture is prepared from 100 g of refrigerator oil and 1 g of N-methylcaprolactam. In the test performed as in example 1 for refrigerant stability the color index changed from 0 to 1. Chloride was not detectable as opposed to the result of the reference test with oil without the additive.

#### Example 3

84 kg of refrigerator oil and 0.4 kg of dipropylene triamine were thoroughly mixed and a sample was tested in Philipp test at 250EC for 96 h against F12. The color index rose from 0 to 2. The chloride detection was negative. The analogous chloride test of the oil without the addition of dipropylene triamine had a positive result.

#### Example 4

0.5 g of N,N-dimethyl-1-naphthylamine and 0.5 g of N-methylcaprolactam were added to 200 g of refrigerator oil. The mixture was stirred well, and 1 ml of this mixture was tested as in example 1 at 250EC. The color index changed from 0 to 3, chloride was not detectable. Without the addition of the stabilizer the chloride detection was positive.

#### **Claim**

Process for stabilizing refrigerator oil/refrigerant mixtures which contain halogenated hydrocarbons characterized by the fact that organic amines and/or amides of organic acids are added to the mixture in a concentration from 0.1 to 4%, preferably 0.5-1% relative to the refrigerator oil.

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